

Land Information System (LIS) Traceability Matrix

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Increasing Interoperability and Performance of
Grand Challenge Applications in the Earth,
Space, Life, and Microgravity Sciences

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Revision 2.0

History:

Revision	Summary of Changes	Date
2.0	Milestone H Updates	March 14, 2003
1.0	Initial Version (Milestone E)	Jul 2002

The purpose of this document is to provide a traceability matrix for the Land Information System (LIS) to be implemented under funding from NASA's Computational Technologies (formerly High Performance Computing and Communications) Project.

This traceability matrix is a table that maps Requirement numbers to Test Case numbers, and, in particular, provides the following information:

- Requirement Specification Number: The requirement paragraph number as listed in the Requirements Specification document.
- Requirement Statement: A brief paraphrase of the actual requirement as it appears in the Requirements Specification document.
- Subsystem: The particular subsystem of LIS that addresses the requirement. The subsystems of LIS are:
 - Main: consists of the main driver and land surface models.
 - Data Management
 - UI: User Interface
 - System Management: consists of tools for managing LIS's Linux cluster.
- Test Case #: The test case or procedure number of the test that will be run to verify the requirement.
- Verification: How well the requirement was verified: not verified; partially verified; fully verified
- Modification Field: Used in case requirement has been modified in any way throughout the life of the project.

Req. Spec. Number	Req. Statement	Subsystem	Test Case #	Verification	Mod. Field
3.1	GrADS-DODS for Data Management	Data Man.	-	-	-
3.2	LDAS for Data Assimilation	Main	-	-	-
3.3	CLM in LIS	Main	-	-	-
3.4	NOAH in LIS	Main	-	-	-
3.5	VIC in LIS	Main	-	-	-
3.6	ALMA for Input Variables	Main	-	-	-
3.7	ALMA for Output Variables	Main	-	-	-
3.8	ESMF Compliance	Main	-	-	-
3.9	Internet-enabled User Interface	UI	-	-	-
4.1	Land Surface Modeling	Main	-	-	-
4.2	Water and Energy Balance	Main	-	-	-
4.2.1	Computation at User-defined Time Intervals	Main	-	-	-
4.2.2	Mass and Energy Conservation	Main	-	-	-
4.3	Land/Water Mask	Main	-	-	-
4.4	Run-time Definition of Domain	Main	-	-	-
4.4.1	Domain Definition	Main	-	-	-
4.4.2	Dynamic Tile Use	Main	-	-	-
4.4.3	Tile Definition	Main	-	-	-
4.4.4	Time-stepping	Main	-	-	-
4.4.5	I/O of Gridded and Point Data	Main	-	-	-
4.4.6	Support for Time-dependent Variables	Main	-	-	-
4.4.7	Restart Support	Main	-	-	-
4.4.8	Start-time and End-time	Main	-	-	-
4.4.9	Mandatory Output	Main	-	-	-
4.4.10	Output Frequency	Main	-	-	-
4.4.11	6-d Gridded Output	Main	-	-	-
4.4.12	Quality Control Output	Main	-	-	-
5.1	1 ms per grid cell per day Throughput	Main	4.2.4, 4.2.5	-	-
5.2	0.4 ms per grid cell per day Throughput	Main	4.4.5, 4.4.6, 4.4.7	-	-
5.3	Performance Monitoring	Sys. Man.	-	-	-
6.1	User Levels	UI	-	-	-
6.2	Web Browser User Interface	UI	-	-	-
6.2.1	Read-only Access for General Public	UI	-	-	-
6.2.1.1	Animated or Still Output Images	UI	-	-	-
6.2.1.2	Contour or Shaded Output Images	UI	-	-	-
6.2.2	Password-restricted Access to Data	UI	-	-	-
6.2.2.1	Near-real-time Access to Data	UI	-	-	-
6.2.3	Password-restricted Access to Run Land Surface Models	UI	-	-	-
6.3	Configuration	UI	-	-	-
6.4	Initialization via Restart	Main	-	-	-
6.5	Write Restart Data	Main	-	-	-
6.6	Queuing System	Sys. Man.	-	-	-
6.7	Batch Mode for Operation	Sys. Man.	-	-	-
6.8	Debug Mode	Sys. Man.	-	-	-
6.9	Error Logging	Sys. Man.	-	-	-
6.10	Publicly Released Documentation and Source Code	UI	-	-	-

Req. Spec. Number	Req. Statement	Subsystem	Test Case #	Verification	Mod. Field
7.1	LIS Shall Run on LIS Cluster	Main	-	-	-
7.2	NOAH and CLM at 1/4 deg on SGI Origin 3000	Main	Baseline	Fully Verified	-
7.3	NOAH and CLM at 5 km on SGI Origin 3000	Main	4.2.1, 4.2.2, 4.2.3	-	-
7.4	VIC at 5 km on SGI Origin 3000	Main	4.3.1	-	-
7.5	LDAS and LSMs at 5 km on LIS Linux cluster	Main	4.3.2, 4.3.3	-	-
7.6	LDAS and LSMs at 1 km on LIS Linux cluster	Main	4.4.2, 4.4.3, 4.4.4	-	-
7.7	GUI Web Browser for User Interface	UI	-	-	-
8.1	Data Management Shall Support LIS	Data Man.	-	-	-
8.2	I/O in GrADS-DODS Format	Data Man.	-	-	-
8.3	Input Data	Main	-	-	-
8.3.1	Input Data Sources	Data Man.	-	-	-
8.3.2	Re-mapping of Input Data	Main	-	-	-
8.3.3	Re-projecting of Input Data	Data Man.	-	-	-
8.3.4	Input Data Spatial Interpolation	Main	-	-	-
8.3.5	Input Data Temporal Interpolation	Main	-	-	-
8.4	Output data	Data Man.	-	-	-
8.4.1	GRIB for Output Data Format	Data Man.	-	-	-
8.4.2	Output Data Conversion	Data Man.	-	-	-
8.4.3	Goode Homolosine for Output Data Projection	Main	-	-	-
8.4.4	Re-projection of Output Data	Data Man.	-	-	-
8.5	Data Catalog	Data Man.	-	-	-
8.6	Automatic Update to Catalog	Data Man.	-	-	-
8.7	Backup of Data	Data Man.	-	-	-
8.8	Data Storage	Data Man.	-	-	-
9.1	Data Reliability	Data Man.	-	-	-
9.2	Authentication and Authorization Enforcement	Sys. Man.	-	-	-
9.3	Web Access Monitoring	Sys. Man.	-	-	-
9.4	Ftp Monitoring	Sys. Man.	-	-	-
9.5	Usage Limited	Sys. Man.	-	-	-
10.1	On-line Overview and Help	UI	-	-	-
10.2	FAQ	UI	-	-	-
10.3	Highlights Page	UI	-	-	-
10.4	On-line Tutorial	UI	-	-	-
10.5	User's Guide	UI	-	-	-